REMARKS

This communication is in response to the Office Action dated September 22, 2004. Claims 1-29 are pending in the present Application. Claims 14-20 have been allowed. Claims 1-4, 6, 8-10, 21-24 and 26-28 are rejected. Claims 5, 7, 11-13, 25 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

102 Rejections

Claims 1, 8, 14 and 21

For ease of review, Applicant reproduces independent claims 1, 8, 14 and 21 herein below:

1. A method for dynamically controlling cooling resources in a data center comprising:
determining a workload within the data center;
determining an amount of heat being generated as a function of the workload; and
activating each of a plurality of different types of cooling resources within the data center in an optimal fashion based on the heat being generated.

8. A system for dynamically controlling cooling resources in a data center comprising:
means for determining a workload within the data center;
means for determining an amount of heat being generated as a function of the workload; and
means for activating each of a plurality of different types of cooling resources coupled within the data center in an optimal fashion based on the amount of heat being generated.

14. A data center comprising:

a global computer system;

a plurality of different cooling resources coupled to the global computer system; and

a cooling resource control module coupled to the global computer system and the plurality of different cooling resources wherein the cooling resource control module includes logic for:

determining a workload within the global computer system;

determining an amount of heat being generated as a function of the workload; and

activating each of a plurality of different types of cooling resources coupled to the global computer system in an optimal fashion based on the amount of heat being generated.

21. A computer program product for dynamically controlling cooling resources in a global computer system, the computer program product comprising a computer usable medium having computer readable program means for causing a computer to perform the steps of:

determining a workload within the global computer system;

determining an amount of heat being generated as a function of the workload; and

activating each of a plurality of different types of cooling resources coupled to the global computer system in an optimal fashion based on the amount of heat being generated.

The Examiner states:

Claims 1, 2, 4, 8, 10, 21, 22 and 26 are rejected under 35 USC §102(e) as being anticipated by Bodas (US 2003/0115000).

Applicant respectfully disagrees. The present invention includes a method and system for dynamically controlling cooling resources in a data center. The present invention dynamically controls a plurality of different types of cooling resources within a data center based on the workload constraints (power consumed, latency, etc.) of the data center. Accordingly, each of the plurality of different types of cooling resources is activated in an optimal fashion based on the workload constraints. As a result of the use of the method and system in accordance with embodiments of the present invention, a substantial savings in

operational costs related to cooling resources is achieved.

Claim 1 recites a method for dynamically controlling cooling resources in a data center that includes determining a workload within the data center, determining an amount of heat being generated as a function of the workload and ***activating each of a plurality of different types of cooling resources*** within the data center in an optimal fashion based on the heat being generated. (Emphasis added.)

The Examiner states that the Bodas reference anticipates the present invention. Applicant respectfully disagrees and asserts that the Bodas reference does not disclose ***activating each of a plurality of different types of cooling resources within the data center in an optimal fashion*** based on the heat being generated as recited in claim 1 of the present invention. Bodas discloses a method for computing the power consumption of a device. The method comprises (1) determining the number and type of each of a plurality of components comprising a system, (2) determining a component power consumption for each of the plurality of components, and (3) determining a device power consumption by summing the component power consumptions of all of the plurality of components.

Applicant asserts that Bodas only relates to the estimation of power and cooling requirements. ***Bodas does not teach or suggest the step of activating each of a plurality of different types of cooling resources within the data center in an optimal fashion based on the heat being generated.*** The Examiner stipulates that Bodas teaches this step in paragraph 5. Paragraph 5 of Bodas reads:

> **Data center facility managers mistakenly interpret P.sub.MAX to be the actual power consumption of the system, rather than the maximum power capability of the power supply. As a result, data center managers currently use P.sub.MAX as a guideline to decide the amount of power and cooling they should provide for each rack, and for the data center as a whole. For systems that consume less power that P.sub.MAX, power delivery and cooling solution based upon P.sub.MAX may be over-designed and more expensive than necessary. Moreover, the philosophy of using P.sub.MAX generates demand on infrastructure, much higher than what would be actually needed. Data centers that use thousands of such systems, this could result in much large demand and expense on infrastructure.**

Applicant fails to see how this paragraph demonstrates the step of activating each of a plurality of different types of cooling resources within the data center in an optimal fashion based on the heat being generated as recited in the present invention. The cooling system of the present invention includes a plurality of different types of cooling resources. For example, in an embodiment of the present invention, a first type of cooling resource is an air-based cooling resource, a second type of cooling resource is a liquid-based cooling resource and a third type of cooling resource is a gas-based cooling resource. ***The Bodas reference does not disclose the implementation of a plurality of different cooling resources as recited in the independent claims of the present invention.***

Furthermore, claim 2 recites an embodiment whereby the optimal fashion is based on a cost associated with the activation of each of the plurality of different cooling resources. ***Bodas does not teach or suggest an optimal fashion based on a cost associated with the activation of each of the plurality of different cooling resources***. The Examiner stipulates that Bodas teaches this step in paragraph 25. Paragraph 25 of Bodas reads:

> **This formulation of P.sub.CONFIG defines the power consumed by the system as it is configured, rather than the power P.sub.MAX consumed in the worst-case scenario. P.sub.MAX indicates what system is capable of**

> **when populated with power hungry hardware running power hungry software. But using P.sub.MAX creates excess demand for power and cooling infrastructure, and thus results in less usable space in rack at data centers, higher demand for power and higher cost. Since P.sub.CONFIG represents actual power that can be consumed by systems, this will help user more accurately allocate and budget more realistic number for the infrastructure. In most cases P.sub.CONFIG will be lower that P.sub.MAX, so data center managers can realize substantial savings, both in cost and space, by using P.sub.CONFIG instead of P.sub.MAX.**

Although Bodas discloses that a substantial savings in cost and space can be achieved by using a different **P** value, Applicant fails to see how this paragraph demonstrates that an optimal fashion of activating each of a plurality of different cooling resources is based on a cost associated with the activation of each of the plurality of different cooling resources.

Consequently, since the Bodas reference does not disclose the implementation of a plurality of different cooling resources, Bodas does not disclose the step of activating each of a plurality of different types of cooling resources within the data center in an optimal fashion based on the heat being generated as recited in the independent claims of the present invention. Accordingly, the independent claims of the present invention are allowable over the Bodas reference.

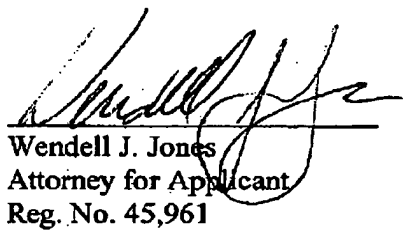
Claims 2-4, 6, 9-10, 22-24 and 26-28

Since claims 2-4, 6, 9-10, 22-24 and 26-28 are respectively dependent on claims 1, 8, 14 and 21, the above-articulated arguments with regard to independent claims 1, 8, 14 and 21 apply with equal force to claims 2-4, 6, 9-10,

22-24 and 26-28. Accordingly, claims 2-4, 6, 9-10, 22-24 and 26-28 should be allowed over the Examiner's cited reference.

Applicant believes that this application is in condition for allowance. Accordingly, Applicant respectfully requests reconsideration, allowance and passage to issue of the claims as now presented. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,



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